

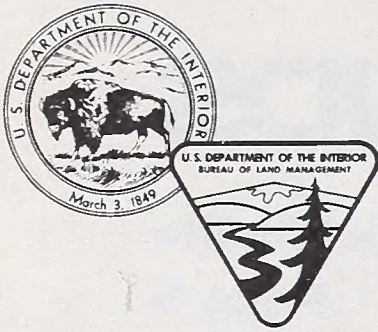
SUMMER 1973

OUR PUBLIC LANDS

Survival Mission Benefits Wildlife

Page 5





U.S. DEPARTMENT OF THE INTERIOR
Rogers C. B. Morton, Secretary

BUREAU OF LAND MANAGEMENT
Burton W. Silcock, Director

As the Nation's principal conservation agency, the Department of the Interior has basic responsibilities for water, fish, wildlife, mineral, land, park, and recreational resources. Indian and Territorial affairs are other major concerns of America's "Department of Natural Resources."

The Department works to assure the wisest choice in managing all our resources so each will make its full contribution to a better United States—now and in the future.

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Jim Robinson, Editor

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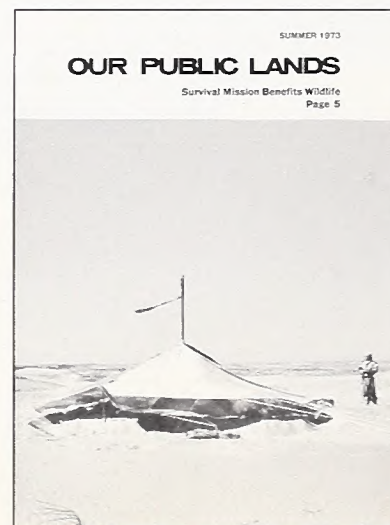
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OUR PUBLIC LANDS

Contents

- FACELIFTING AT ZUNINO 4**
By Donald J. Seibert and Phyllis Page
The community lent a hand
- SURVIVAL MISSION BENEFITS WILDLIFE 5**
By Wayne Elmore
27 men, 840 pounds, and 17 hours
- EVERYBODY TALKS ABOUT THE WEATHER 7**
By Kerry L. Cartier and James W. Franks
This may be a way to do something about it
- AN EAGLE'S VIEW FROM MINERAL RIDGE 10**
By Larry Woodard
History and beauty are preserved for future generations
- NATURE'S PANORAMA 12**
By Jim Yoakum
Living things are part of Nature's grand purpose
- SIUSLAW FISH GET A HELPING HAND 15**
By Dan Wyant
Federal and State agencies are improving fish habitat
- TRANQUILITY WITH A VIEW 18**
By Doyle Kline
Recreation where the people need it
- LEFFINGWELL: PRUDHOE'S PIONEER SCIENTIST 19**
He helped us to understand the Arctic
- PUBLIC SALE BULLETIN BOARD 22**



Airmen were learning survival techniques for their mission and it brought great benefits for the wildlife of the southeastern Washington desert area. Cover photo by Wayne Elmore.

HIGHLIGHTS

O&C Counties Receive Record Payment of \$40 Million

Eighteen western Oregon counties that share in the receipts of timber sales on certain Federal lands in Western Oregon received a record total of over \$40 million for an 11-month period ending May 31, 1973.

The money, amounting to \$40,735,698.45, represented revenue from the sale of Federal timber on what is commonly known as the O&C lands. These lands were once granted to the Oregon and California Railroad, but were reclaimed by the Federal Government in 1916 and are now administered by the Department of the Interior's Bureau of Land Management.

The 11-month payment has been agreed upon by BLM and the officials of the 18 counties so that the counties can plan their fiscal budgets for submission by July 1.

A subsequent payment for the month of June is made to the counties after all receipts are collected by the U.S. Treasury. Checks representing this final accounting are usually made in August.

The record high revenues resulted from higher prices for stumpage because of increased demands for timber products in housing construction. The increase came in a year when the allowable cut on the O&C lands was reduced because of environmental considerations.

Interior Extends Public Comment Period on Proposed Grazing Regulation Changes

An extended period for public comment on several proposed changes in grazing regulations for the public lands administered by the Bureau of Land Management has been set by the Department of the Interior.

One proposed change would restrict the use on public lands of chemical toxicants for killing predatory mammals or birds, or their use if it could cause secondary poisoning to nontarget animals.

A second proposed change would authorize BLM to cancel or reduce public land grazing privileges for unauthorized use of such chemical toxicants for killing or with secondary effects.

Public comment on these proposed changes will be welcomed until 45 days after publication of an environmental impact statement which is still being prepared within the Department.

The period for comment ended June 12 for one proposed change to permit the Bureau to cancel grazing privileges for violation of Federal and State conservation laws.

Interior Invites Nominations Beyond 200- Meter Depth From Oil and Gas Industry

The Department of the Interior has for the first time invited the oil and gas industry to include tracts beyond the 200-meter depth among those it would nominate for a future lease sale off the Louisiana coast.

Secretary Rogers C. B. Morton said the move was in response to President Richard M. Nixon's directive to triple the annual acreage leased on the Outer Continental Shelf by 1979. The action is consistent with the President's Energy Message of April 1973, and his oceans policy statement of May 1970.

Secretary Morton reported that expanded lease sales will begin in 1974 to include areas beyond the 200-meter depth but landward of the 600-meter contour.

He emphasized that no decision will be made to hold the sale until the Department has made a full study of environmental factors and hearings have been held to give the public an opportunity to comment on environmental matters.

Face-lifting at Zunino

FOR 50 years the Zunino irrigation reservoir 30 miles south of Elko has provided excellent fishing, but the area around the water lacked habitat for waterfowl and other wildlife.

The Elko District Office of the Bureau of Land Management decided to give the area a facelifting. Money was budgeted to fence 40 acres of public land around the reservoir and to plant grasses, forbs, and flowering plants within the enclosed area.

Then the BLM staff went to the area residents with its plan. Would the community like to help the Bureau complete the project? Response was enthusiastic.

Groups which became involved included the Nevada Departments of Forestry and of Fish and Game, BLM's District Advisory Board, the Elko Sportsmen Club, Kiwanis Club, four Boy Scout troops, and the Nevada Youth Training Center, a correctional institution.

The Advisory Board contributed \$50 from grazing fee revenues which was used to purchase more forbs, and the State forestry agency provided tree seedlings. From agencies and other organizations, 55 men and boys volunteered a weekend for planting, and 7 Bureau employees contributed their weekend hours to join the community volunteers. The Nevada Youth Training Center also had a Boy Scout troop, and 2 men and 18 boys added their efforts.

Willow tree
will provide
shade

As the land responds to the care and to the trees and vegetation which were planted, waterfowl and other wildlife will find food and cover. Natural beauty is showing up already, and the increasing wildlife population which the area now can attract will provide opportunities for nature study and seasonal hunting.

BLM provided the impetus for a facelifting at Zunino, but the concept really got off the ground when the community lent a hand. □



Protection fence around a Siberian elm tree

The community lent a hand

By **DONALD J. SEIBERT**

Wildlife Specialist

and **PHYLLIS PAGE**

Clerk-Typist

BLM District Office
Elko, Nevada





Lack of roads hampered airmen



Rugged country with a heavy load

Survival Mission Benefits Wildlife

27 men, 840 pounds, and 17 hours

EXHAUSTION was overtaking the airmen in the desert. Constant burning sunlight beat down on the golden brown sands. Shimmering heat waves rose from the surface in wavy lines that blurred the horizon. Although the thermometer registered 110°, the sand had stored heat until the surface temperature was 130°.

The 27 airmen were lugging an 840-pound load through the blistering desert. The load was rigged for transporting in slings and harnesses, and the nearly exhausted airmen were skidding, dragging, pushing, and pulling it. After more than 3 miles of sand dunes and gullies, the load felt more like plowshares and lead pipe than fence posts, roofing material, and fiberglass water tanks.

By **WAYNE ELMORE**
Wildlife Biologist
BLM District Office
Spokane, Washington



Juniper forest wasteland

The airmen were U.S. Air Force Survival Trainees whose efforts in the wasteland of the Juniper Forest on public land in southeastern Washington saved the Federal Government money and was a direct survival benefit to wildlife.

These 2,500 acres are an area of high public interest with the largest concentration of juniper trees in the State of Washington and a low annual rainfall. Despite the desert appearance, there is a rare abundance of wildlife present on the land: Ord's kangaroo, pygmy cottontail, Western burrowing owl and Harlan's hawk (both classified as rare in the State), jackrabbits, mule deer, California valley quail, pheasants, Hungarian partridge, coyotes, bobcats, and badgers.

The Bureau of Land Management decided to close the area to vehicular traffic as a protection for the wildlife. The use of the Air Force Survival Trainees came about when the Bureau decided to install two water storage cisterns for the wildlife on the land, after the area had been closed to vehicles.

How to get the cisterns installed at the lowest cost without using vehicles to transport materials and men over the fragile surface was the problem to which the Air Force Survival School provided an answer with its trainees.

They were fresh from a several-day session in shore survival techniques when the school volunteered them for the desert survival mission. The men, who were being trained to become instructors in the school, extended their stay 4 days in the desert, although the actual transporting and construction project took only 17 hours.

One of the training sergeants waved off the proffered thanks. "We were happy to do it. Besides it taught the boys what it's like to work in the desert without water!" □

Wildlife water storage cistern



Everybody Talks About the Weather

AH, sweet summer in Alaska's interior: 20 to 24 hours of sunshine, 75°- to 85°-temperatures, blue skies with a few big puffy clouds and—ZAP!—lightning!

During some years in Alaska, lightning causes almost 80 percent of the wildfires in the forests and on the tundra. In 1972, Alaska had a record 767 fires, and in early July of that year lightning sparked 427 fires in just 11 days.

Lightning has caused fires for centuries, and the most that men could do to protect their cities and their buildings was to divert the bolt with lightning rods.

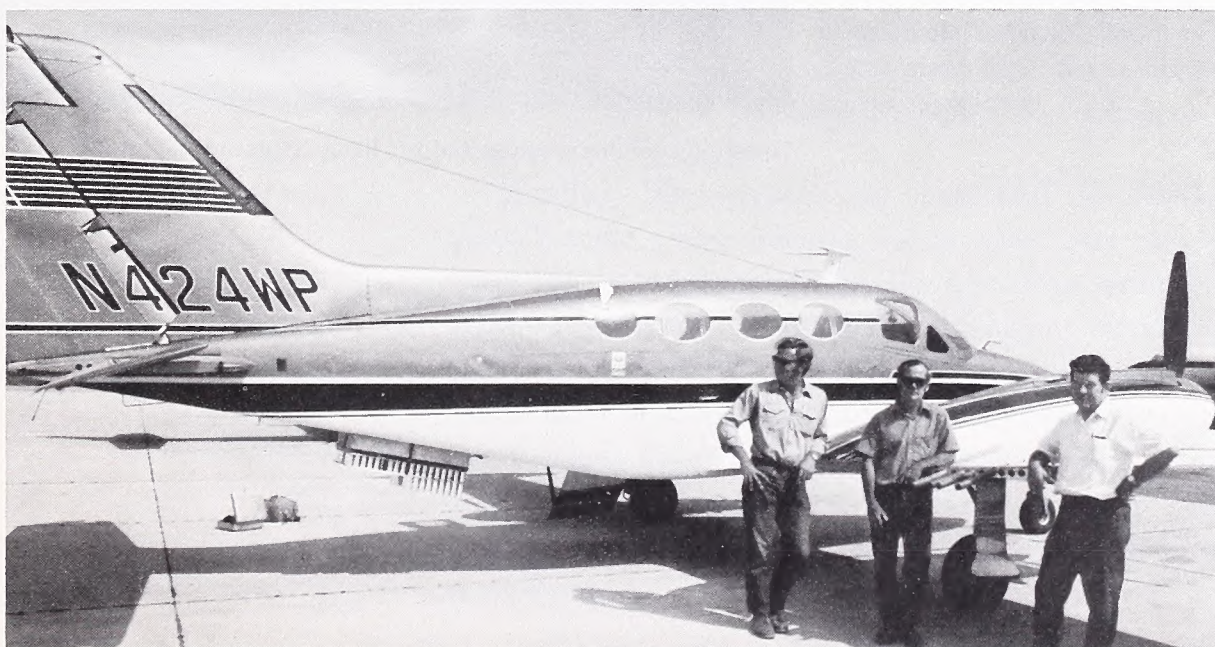
There was no way to prevent lightning-caused fires in woodlands and meadows. But now some of the lightning is being prevented in Alaska, and this may in turn prevent some of the lightning-caused fires.

Of course the Bureau of Land Management, which has responsibility for fire suppression on 220 million acres of Federal, State, and Indian lands in Alaska, isn't putting up lightning rods in the forests and on the tundra. What BLM is doing, however, is seeding thunderheads, the kind of clouds which produce lightning.

Clouds are seeded from an airplane which flies above them and fires silver iodide crystals down into the clouds. The crystals are packed into flares which resemble shotgun shells both in appearance and in operation. Four racks carried beneath the plane hold more than 100 flares, and each can be fired separately.

Knowing where to find the lightning-producing thunderheads involves the use of weather science. Early each summer morning, weather balloons with minia-

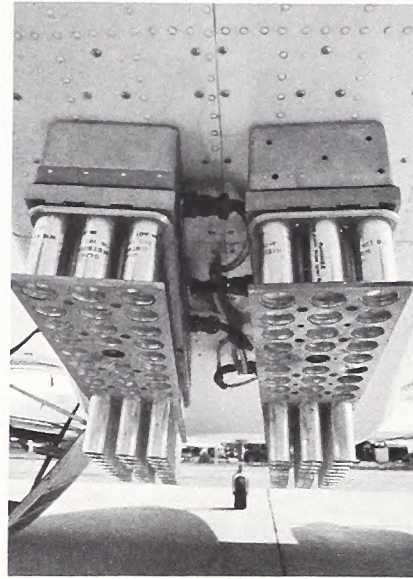
Aircraft ready for cloud-seeding



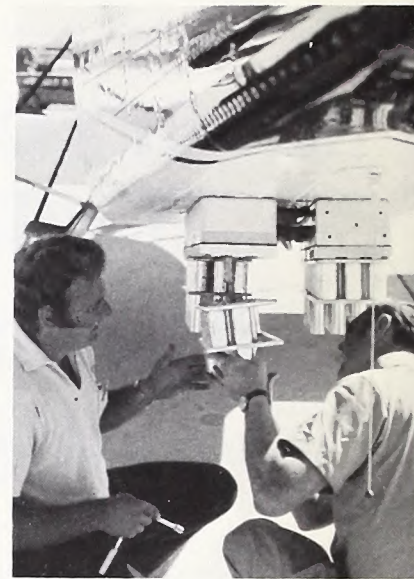
This may be a way to do something about it

ture radio transmitters are launched to gather weather information. This and other weather data from ground stations and earth satellites are compiled by the National Weather Service to forecast areas with possible thunderstorm activity. Then a computer at the University of Alaska processes all the data, including the ground temperatures which are needed to produce the thunderheads. This will determine the diameter and height of probable lightning-producing clouds.

Then the final step is to go aloft and find these thunderheads and dissipate them. Flying at an altitude of greater than 20,000 feet, the pilot can see 200 miles in any direction. Since the gigantic clouds he's looking for may have a height of 30,000 feet, they



Vertical fall seeding flares mounted under airplane. Longer cartridges contain more seeding material



Loading flares is relatively simple task

By **KERRY L. CARTIER**
Writer-Editor

and **JAMES W. FRANKS**
Alaska Weather Modification
Project Leader BLM State Office,
Anchorage, Alaska



Towering cumulus cloud is mature, likely to produce lightning



"Popcorn" appearance indicates rapid growth, high lightning potential



After seeding, lightning potential is destroyed; ice crystals may seed adjacent clouds, prevent further lightning activity

are easy to find. The plane cannot seed every cloud in such a gigantic area, so the pilot flies where the clouds are most threatening.

Up close, the tops of the clouds look very firm, like kernels of popcorn. If the top edges of the cloud are sharply outlined, the cloud is of the kind known to be composed of water vapor. In sub-Arctic Alaska's skies, such a thunderhead is a probable lightning-producer, so the plane flies over the cloud and fires silver iodide crystals into it. The crystals act as nuclei on which water in the cloud can collect. As water vapor attaches and freezes, the heat of fusion causes the cloud to rise still higher, cool internally, and convert most of its water vapor to ice crystals.

Eventually the cloud will be composed of nothing but small ice crystals. As water vapor, this moisture has the capacity to cause lightning, but as ice crystals the cloud's potential for lightning activity has vanished. The formerly firm-looking cloud will have very indistinct edges and a shape somewhat like an anvil. Wind will eventually break up the cloud, and the drifting ice crystals will evaporate in the sky.

The Bureau launched this Weather Modification Project in the summer of 1972 as an experiment, and will continue it this summer to further test its initial success. The project is based at BLM's Fairbanks District Office, and is the first operational fire prevention project of its kind in the Federal Government's fire prevention program. Data in cloud-seeding actually originated with the U.S. Department of Agriculture's Forest Service in "Project Skyfire" in 1969, and the knowledge gained there has been applied to the Bureau's program.

"Weather Modification" as practiced in Alaska doesn't mean rain-producing as the term does in the lower 48 States. Instead, the cloud-seeding technique makes it possible for lightning-producing clouds to grow, freeze, and die—and this kind of cloud probably would have produced but little rain anyway. What the cloud would have produced is lightning which could have started fires somewhere in Alaska's interior. Preventing these fires is what Alaska Weather Modification is all about. □

An Eagle's View From



Lake Coeur d'Alene

A VISITOR to northern Idaho marvels at the beauty of its lakes and forested mountains. These natural features are evident when you stand on the picturesque shores of lakes such as Priest Lake, Lake Pend Oreille, and Lake Coeur d'Alene.

These 3 are visited by thousands annually, and this summer between 30,000 and 40,000 Boy Scouts will camp on the shore of Lake Pend Oreille during their National Jamboree. Of these three major lakes, how-

Mineral Ridge

ever, Lake Coeur d'Alene is visited by the largest number of people. The distance from here to Spokane, Wash., is only 40 miles, and the city of Coeur d'Alene is built on its north shore. Interstate 90 runs along a portion of its eastern arm.

As a westbound visitor on Interstate 90 catches his first glimpse of Lake Coeur d'Alene, his sight is drawn to a precipitous timber slope, which forms a southern backdrop to the eastern arm of this beautiful lake. This slope is Mineral Ridge, and it was Idaho's first Bureau of Land Management recreation site.

Development of a small (152-acre) tract as a public recreation site was unprecedented when the Bureau was allotted funds for this work in 1963 under the accelerated public works program.



Visitor facilities

Local workers built 3 miles of hiking trail and developed seven vista points for rest and scenic viewing. One of these spots has become a nationally known location for taking photographs of Lake Coeur d'Alene. A log information center was built at the summit.

Mineral Ridge today is still a place of tranquil beauty. City lungs pound heavily against the chest during the climb from the lakeshore parking lot to Caribou Cabin on the ridge top. But when he reaches the summit, the

History and beauty are preserved for future generations

hiker has for the first time an eagle's view of Lake Coeur d'Alene and the interstate which was once the old Mullan Road of the 1800's. He can see where bald eagles gather each winter to feed on the spawning Kokanee salmon. There is evidence of the early mining years when men searched these hills for wealth and fortune.

Mineral Ridge was designed to capture and retain these priceless values for generations to come. But, as with any recreation area, changes must occur to accommodate the growing public use, and plans are being drawn to improve the facilities for those who take the time to hike the trail.

With the first world exposition on the environment slated for nearby Spokane next summer (Expo '74) Mineral Ridge will be enjoyed by more people than ever before. New benches, a restored section of a small mine, and improved visitor facilities will be ready for expected crowd.

Local poets with homespun imagery have traced their love of the history and beauty of this land. At Caribou Cabin, a visitor will find some poems written and collected when Mineral Ridge was originally developed as a BLM recreation site.

More than a hike or a photography outing, Mineral Ridge is an inspirational experience for any visitor to this small segment of the National Resource Lands. □

By LARRY WOODARD

District Manager
BLM District Office
Coeur d'Alene, Idaho

Nature's Panorama

FROM a distance, the mountains of the West look like dimpled folds spread carelessly over the rugged land.

Sometimes the mountains are dun-colored; sometimes a dusky purple hue steals over the silent land.

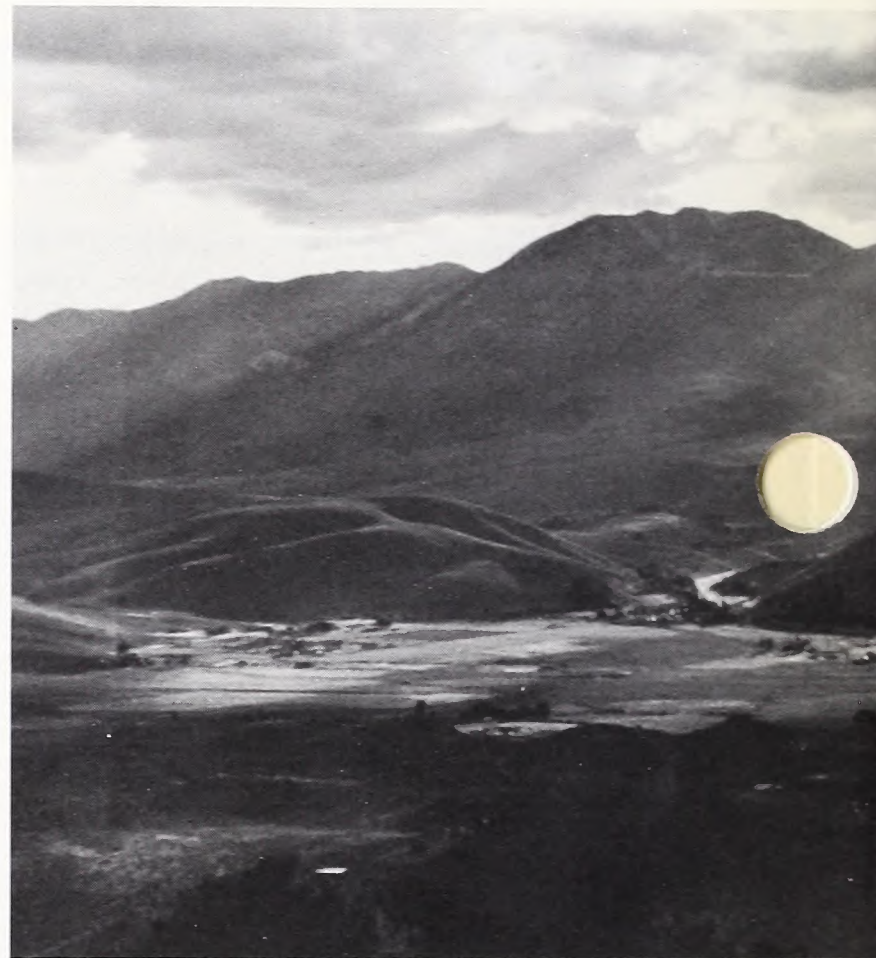
The foothills, the slopes and peaks, the alpine valleys and meadows, and the high desert country are mantled with plants and the wild animals that find food and shelter here.

These living things are part of Nature's grand purpose. In season, and depending upon the amount of moisture for plants and food for wildlife, the public lands of the Western mountains and high desert country present a highly varied panorama of Nature for the discriminating eye.

From horizon to horizon there's plenty to see, but a closeup look may be even more rewarding.

Text and Photos
By JIM YOAKUM

Wildlife Specialist
BLM State Office
Reno, Nevada



Home and food for plants and wildlife



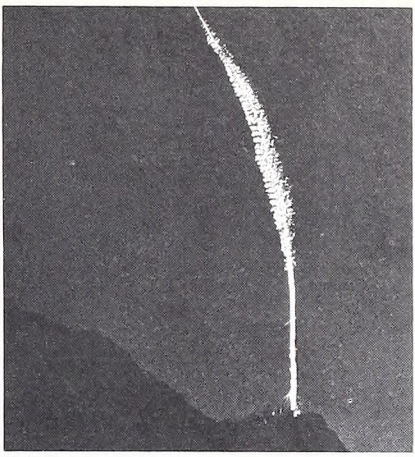
Fawn nestles among blooming mules ears



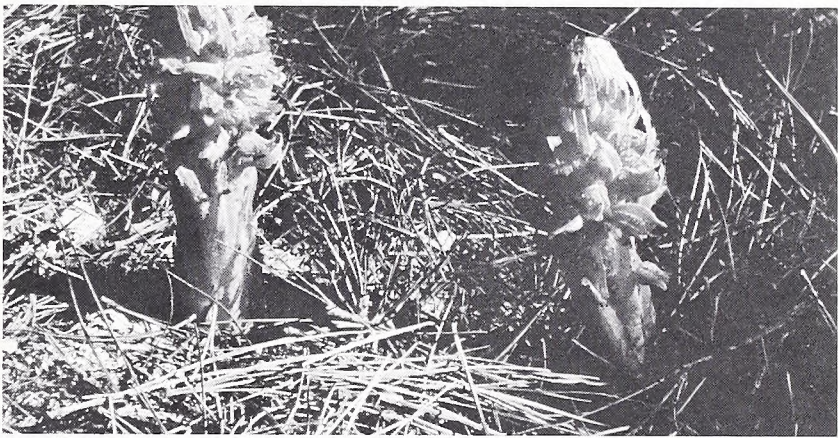
Yucca is named for Spanish bayonet



Joshua tree is member of lily family, flowers in spring



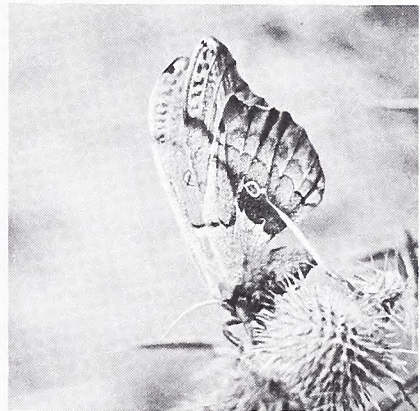
Even after blossoms have fallen, yucca remains a flaming sword at sunset



Brilliant red snow plant bursts through bed of pine needles



Swallowtail butterfly on Indian paintbrush



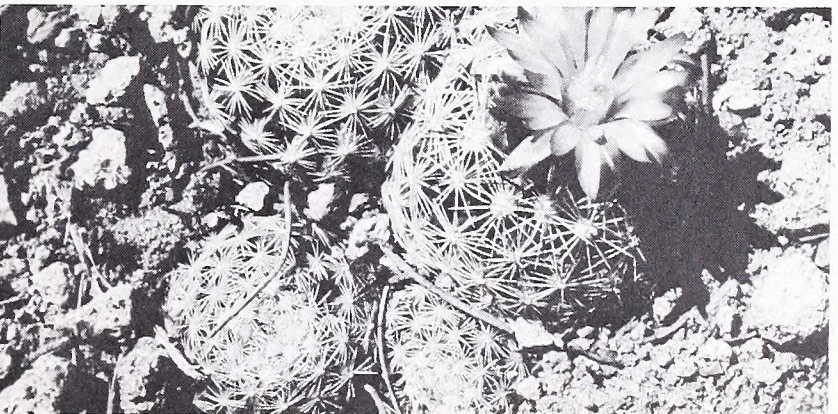
Vivid purple flower of thorny thistle attracts a Saturn moth



Green fern provides nest for hummingbirds



Tiny cactus flowers appear in almost any color



Barrel Cactus produces delicate flower

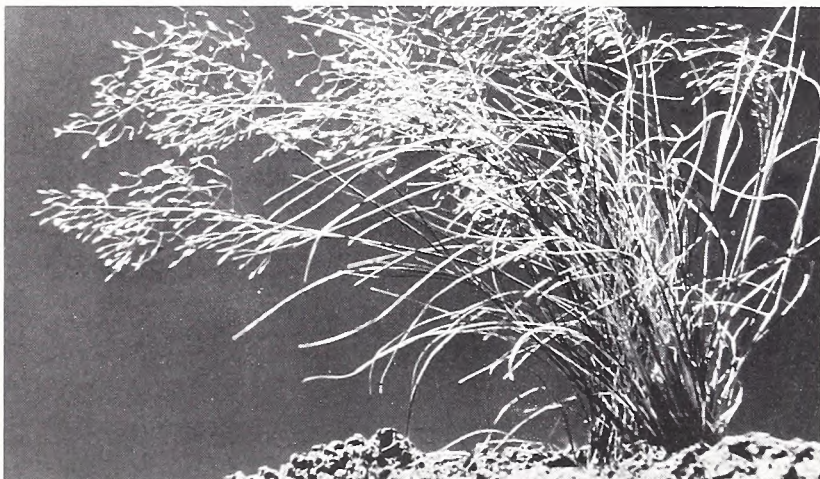
*Living things are part of
Nature's grand purpose*



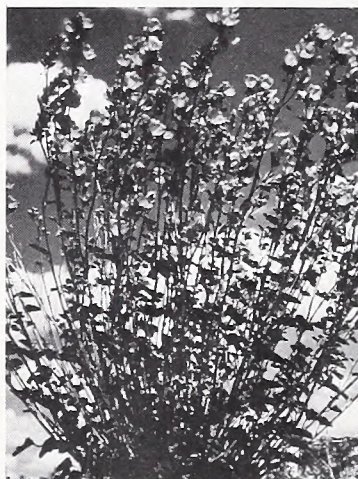
Baby porcupine feeds on dandelions



Balsam root is often mistaken for a sunflower



Indian ricegrass looks like lace waving in the wind



Globe mallow is mass of flowers
once a year



Parry primrose in sunset profile



Big sagebrush in bloom



Bristlecone pine cling tenaciously on craggy peaks, are oldest
recorded living plants



Flame yellow aspen in fall se

SIUSLAW FISH GET A HELPING HAND

By DAN WYANT*

THE truck driver balked the first time John Engels told him to dump a load of gravel into the middle of the Siuslaw River.

"Are you sure you know what you're doing?" the driver asked, eyeing the gravel he had hauled 40 miles from Eugene.

Engels assured him that he did.

*Based on an article in the Eugene (Oregon) Register-Guard newspaper. Photos by Phil Grenon.

*Federal and State agencies
are improving fish habitat*

Dumping the gravel is part of a plan to improve the fish habitat in the upper Siuslaw and its tiny tributaries so that more salmon, steelhead, and cutthroat trout will have a place to spawn.

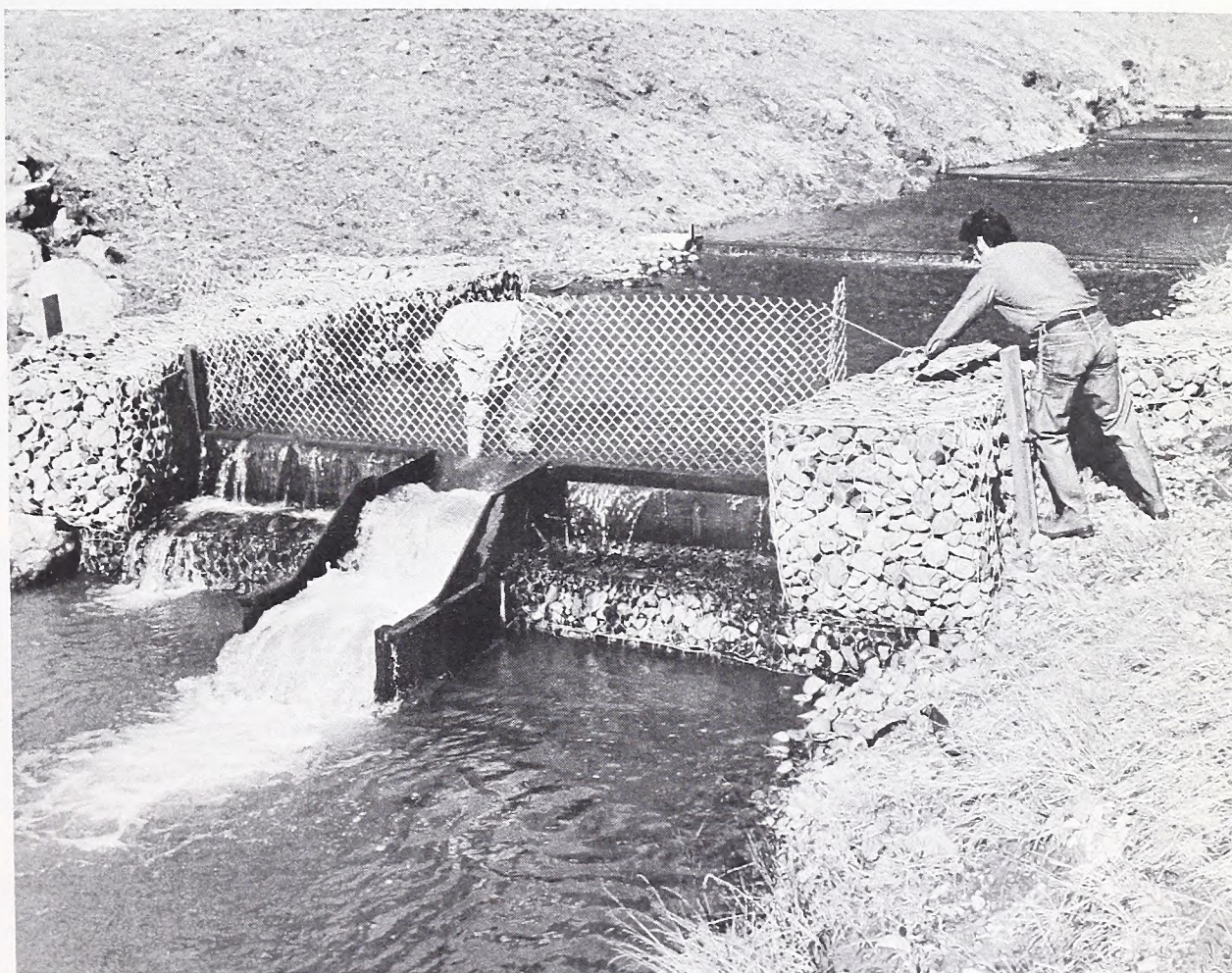
Parts of the upper river have been scoured clean of sand and gravel over the years by heavy winter runoffs, leaving a streambed with stretches of nothing more than bare bedrock. There aren't enough places for the returning female fish to lay their eggs.

Of course it would do little good to haul gravel from Eugene and dump it in the river unless there's some assurance it will remain there.

That's why Engels, a forester with the Eugene office of the Bureau of Land Management, is in charge of the



Gabions under construction





Fishery biologist checking condition of fish

design and construction of "gabion" structures at many points along the main river and in its tributaries.

Gabions are rectangular wire mesh boxes, varying in size, which are filled with stones to create barriers or deflectors that influence the stream flow.

These, along with weirs (low-level dams), have been used to preserve existing pools and create new pools, establish gravel beds, and aerate the water, all to make the waterways more hospitable to spawning salmon and steelhead who have returned from the Pacific Ocean.

Working with Engels is Russell Hammer, fishery biologist for BLM at Eugene. The Federal agency is involved because the upper river and its tributaries flow through O. & C. Federal timberlands managed by the Bureau (Oregon and California Railroad Revested Lands).

The first gabions were installed on an experimental basis in 1968. The first major project was in 1970 at a cost of about \$20,000. Another habitat improvement project was carried out in 1972 at a cost of about \$17,000.

Part of the latest work involved the creation of an artificial spawning channel on Grenshaw Creek, one of the Siuslaw's tributaries.

That project was accomplished by cutting through a sharp, ox-bow curve in the stream and lining the chan-

nel with gravel. Controls were installed at the upstream end so that the waterflow can be regulated.

During high water, the gravel won't wash away because the flow can be reduced by the controls. During low-water periods the gates can be opened.

State Game Commission staff members, who are working with BLM in the stream improvement projects, recently stocked the channel with 60 adult steelhead, ready to spawn.

After a few days, females were digging out nests in the gravel and laying their eggs.

Hammer and Engels said some of the tributaries have enough gravel to form spawning areas when series of low dams are installed. In other cases, gravel is dumped in and allowed to wash downstream into place behind the dams or gabion barriers.

So far, gabion structures of various types have been put in place on the main Siuslaw below Siuslaw Falls, below Dogwood Creek, above Haight Creek, and above Whittaker Creek. Tributaries with installations include Bounds Creek, Esmond Creek, Oat Creek, Eames Creek, and Grenshaw Creek.

BLM has been working on a schedule which calls for a year of installations followed by a year of maintenance and observation of the results. No major work is planned this year.

BLM will probably direct its attention next to the extreme upper stretch of the Siuslaw and some of its tiny tributaries above Siuslaw Falls near the community of Lorane.

Now that the Game Commission has constructed a fish ladder at the falls, Hammer said, the upper section will be more accessible to returning migrant fish, although some of the tiny tributaries dwindle to little more than a trickle by midsummer.

To remedy this low-water problem, the men may try to improve the upper drainage's spawning capacity by using dynamite to blast out some deep pools in the shallow stream bottom.

"The Coos Bay District of BLM has had considerable success deepening pools in Vincent Creek this way," Engels said.

It's too early to measure the success of the Siuslaw

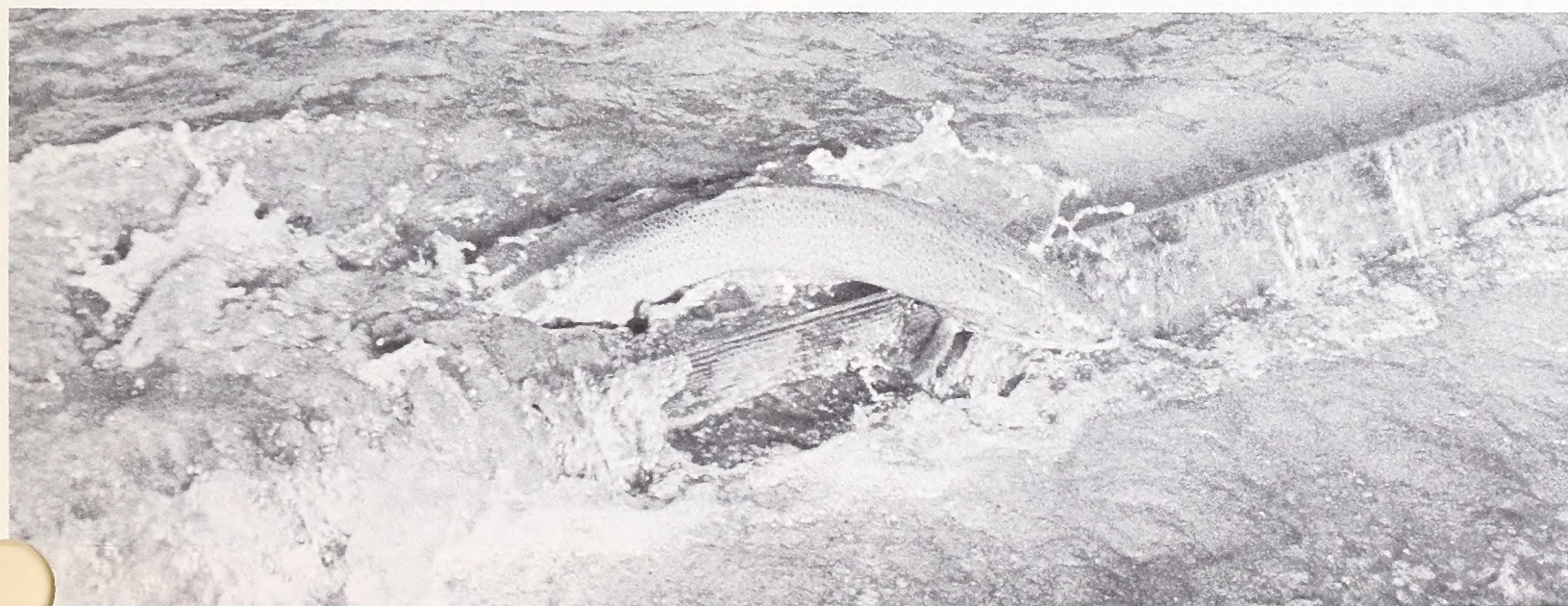
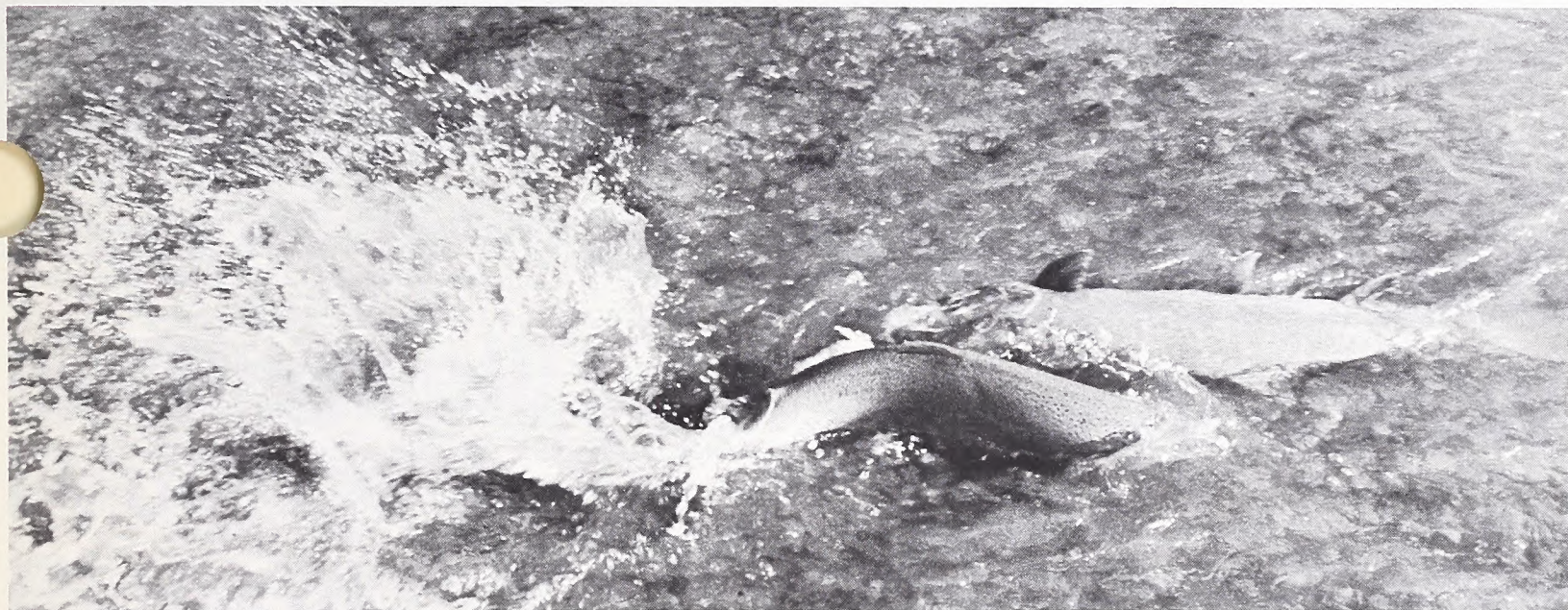
improvements in terms of the numbers of returning mature fish. Most of the fish that have hatched in the gabion gravel beds aren't due back from the ocean for another year or two.

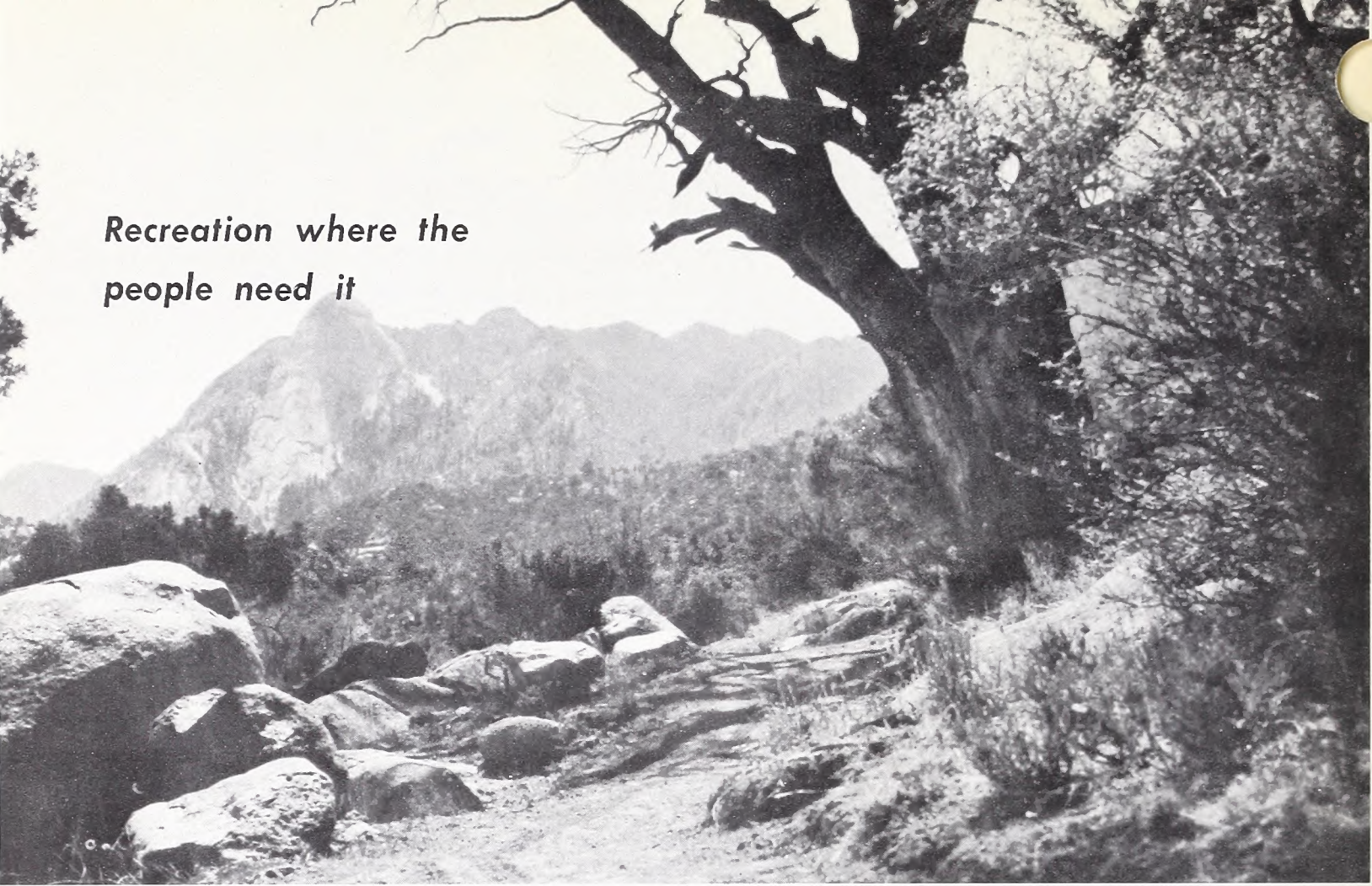
But counts of the numbers of young salmon and steelhead hatching from eggs in the new gravel beds are promising.

Counts in the stream areas where the gabions have been placed ranged from 6 to 50 juvenile fish per 100 feet of stream in 1 survey. In contrast, the counts were from zero to five fish per 100 feet in stretches of natural streambed.

"We've seen enough juveniles in the pools to think that we're going to have some good returns," Engels added.

And that's promising news to anglers who look to the Siuslaw for their salmon and steelhead fishing. □





*Recreation where the
people need it*

Tranquillity With a View

IN the 27,000 acres of the Organ mountains and their foothills near Las Cruces, N. Mex., there is tranquillity.

Camping sites, picnic sites, and trails provide long, long vistas of desert serenity only 90 minutes from an urban complex where 1 million people dwell.

The wonders of geology are there for the looking in the Organ Mountain Recreation Lands and at Aguirre Spring where the camping and picnicking facilities are located.

The 9 miles of hiking and nature trails, which are part of the National Recreational Trails System, provide relaxation for nature lovers. Varied plants, animals, and birds, add color and sound to the harsh desert environment.

This major recreation complex was developed with the cooperation of New Mexico State University which

By DOYLE KL

Public Affairs Office
BLM State Office
Santa Fe, N. Mex.

owns land in the area. The Bureau of Land Management expects 85,000 annual recreation visits. Additional recreational facilities may even double the number of annual recreation visits in the next few years, based on today's rate of yearly increase.

BLM is building carefully, unobtrusively in this relatively small and fragile mountain range. Care must be taken to safeguard the area from the tread of too many pairs of shoes, from too many roads and buildings, and the litter that people drop thoughtlessly. □



See additional pictures on p.



Mull, who first visited the camp in 1966, was instrumental in getting the site named to the National Registry of Historic Places
—Gil Mull Photos

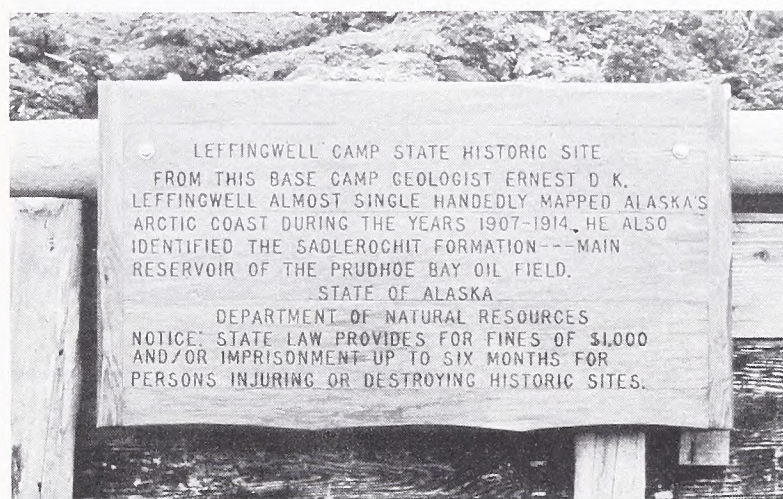
Leffingwell: Prudhoe's Pioneer Scientist*

IN the summer of 1971, C. G. Mull, a geologist with Exxon U.S.A., helicoptered onto a remote, wind-swept tundra island in the Beaufort Sea. His mission: to erect a cedar plaque honoring another, earlier, geologist whose pioneering scientific work in the Arctic laid the basis for much of today's understanding of that region.

By **WILLIAM S. HANABLE**

Historian
State of Alaska

**He helped us to
understand the Arctic**



A plaque erected by Exxon USA geologist Gil Mull describes Leffingwell's contribution to knowledge of the North Slope
—Dr. George Watson Photo

The weatherbeaten wooden shack to which Mull affixed the plaque naming it to the National Register of Historic Places was the base camp of Ernest de Koven Leffingwell. Perhaps the least known of the Arctic explorers, Leffingwell was the cartographer of Alaska's Arctic coast and named the Sadlerochit geological formation that has since been found to extend to Prudhoe Bay, where it forms the main reservoir of the Prudhoe Bay oilfield.

Born in 1875, Leffingwell became a polar explorer in 1901 when he headed the scientific staff of the Baldwin-Ziegler Polar Expedition which worked out of Greenland. At this time, he met and formed a friendship with Ejnar Mikkelsen, a Danish adventurer and Arctic expert. The two decided to form an expedition of their own to explore Alaska's Beaufort Sea and investigate rumors of a land mass to the north of the Arctic coast.

*Reprinted from Exxon U.S.A., First Quarter 1973.



From 1906 to 1914, Ernest de Koven Leffingwell lived and worked in this cabin built from timbers of a wrecked sealing schooner

With the backing of John D. Rockefeller, who contributed \$5,000—approximately half the venture's cost—the pair organized the Anglo-American Polar Expedition. In 1906, with a doctor, a naturalist, and four sailors, they set sail from Victoria, B.C., on a small sealing schooner which they had purchased and renamed *The Duchess of Bedford* in honor of another of their sponsors.

Handicapped by the lack of engines, the little ship met with frequent difficulties in navigating through the



Flaxman Island, where Leffingwell established his camp, lies close to the North Slope shore about 60 miles east of Prudhoe

Beaufort Sea pack ice. By the end of the summer, the explorers had journeyed as far as Flaxman Island, a bit of land not far from the coast which had been named by the explorer John Franklin in honor of an English sculptor, John Flaxman. Here freezing weather caught up with *The Duchess of Bedford* and immobilized her in ice.

The explorers wintered on Flaxman Island. But when spring thaws made travel possible once again, they found *The Duchess of Bedford* was no longer seaworthy. Retreating ice had pulled the caulking from her seams. All but Leffingwell voted to return to civilization, but he chose to remain on the island to carry out the scientific observations that he had come to get.

The men dismantled their ship, and built Leffingwell a cabin from the interior woodwork. Mikkelsen then journeyed overland to Valdez with a team of sled dogs, while the others hailed a passing whaleship.

Alone, Leffingwell began what was to become a heroic demonstration of scientific dedication and personal courage. Between 1906 and 1914, the geologist spent nine summers and six winters on the lonely stretch of coast between Point Barrow and Herschel Island.

With the aid of Eskimo helpers, he made 31 trips by sled and small boat, covering 4,500 miles during 20 months away from his base camp. Occasionally, solitary existence was enlivened by a visiting explorer or the crew of a passing whaler.

The hardships he endured in mastering the elements and making accurate observations are hard to imagine. The cold was his constant enemy. His reports indicate that -20° was the normal temperature along the coast in winter, and at times he experienced temperatures of 60° below (when spittle freezes as it hits the ground) and winds of up to 70 knots.

Leffingwell dealt with the cold, not from the inside of the cabin, or from the substantial frame house he built in 1909, but directly. His observations of latitude and longitude and mapping calculations required that he work out of doors in the coldest weather. He advised those who would continue the work:

"As the wood of a pencil is notably cold, the pencil should be wrapped in cloth or held in the mouth. . . . Before a series of observations is completed, the fingers may grow too stiff to make the required adjustments, but by means of the lantern they may be rendered pliable enough to finish the set."

Since flesh would stick to metal in subzero temperature, Leffingwell had to cover the knobs and knurls of his instruments with surgeon's tape. Sometimes, in extraordinarily low temperatures, the kerosine in the lantern would become too stiff to flow.

Discussing the merits of various types of sleeping bags, he notes that in a bag of caribou skins, "Only once, when the thermometer was at -50° F., were the writer's feet cold."

Despite daily difficulties that would have defeated a lesser man, Leffingwell felt that only once had his life ever really been in danger. While he and an Eskimo companion were hunting on pack ice, his dory broke its moorings and began drifting away.

Realizing it was a "life or death" situation, Leffingwell dived into the freezing water and retrieved the boat: Then followed a race with time in which he and the Eskimo built an igloo of blocks of snow in which he attempted to thaw out while snow was melted and boiled on a seal-oil stove to make scalding tea. A few minutes of such exposure is usually fatal.

Many months of the geologist's years in the Arctic were spent at his base camp on Flaxman Island. Another arctic explorer, the ethnologist Vilhjalmur Stefansson, visited Leffingwell there and noted that his accommodations "... ranged from the sumptuous to the effete."

Leffingwell's comforts included a large, multilanguage library, and a rolltop desk. But Stefansson hastened to add, in his book, *The Friendly Arctic*, that Leffingwell's outfit "was in the main a relic of the times when he had been a tenderfoot and his tastes had not yet been turned towards simplicity by his experience in the North."

In 1907, Leffingwell enjoyed an assortment of jams and marmalades, but by another of Stefansson's visits in 1913, the proposal that breakfast might consist of oatmeal mush and hot cakes "struck Leffingwell as an extraordinary suggestion: 'Mush and hot cakes! If you have mush what's the use of hot cakes? And if you have hot cakes, what's the use of mush?'"

The winter of 1913-14 was Leffingwell's last on Flaxman Island. He left in the spring and travelled to Washington, D.C. There, using offices provided by the United States Geological Survey, he spent a year and a half writing a professional paper on his investigations. It was published in 1919 by the USGS under the title, "The Canning River Region, North Alaska."

Alfred H. Brooks, geologist then in charge of USGS's division of Alaska mineral resources, prefaced the paper with an introduction characterizing Leffingwell's work as "the first accurate chart of the North Arctic coast of Alaska ... a valuable contribution to our knowledge of Alaska's larger geographic features ..."

Writing in the *Explorers Journal* in 1961, Leffingwell described the contents of his paper:

In addition to the astronomical observations ... ,

I triangulated about 150 miles of the coast and mapped the details upon a scale of 1/125,000, and entered the positions of about 1,500 soundings. I made a sketch map of the entire coastline between Point Barrow and the Canadian boundary ... mapped the main geographic features of an area of about 50 by 80 miles of the mainland ... drew the known and probable distribution of 15 geological deposits ... Ground ice I discussed at length and elaborated the Wedge Theory ... My report of petroleum seepages near Point Barrow attracted more attention than all the rest of my work. It started a small oil rush ... However, President Hoover ... withdrew it ... and created a Naval Petroleum Reserve ... I have heard that a large oilfield has been mapped, and that the large establishment at Barrow is now heated by gas from wells in the neighborhood."

Leffingwell commented that his work in the Arctic, "Not being spectacular, attracted little public notice, and during the excitement caused by Peary, Cook, Stefansson, and Amundsen, I was the forgotten man."

But other students of the Arctic, such as Gil Mull, knew of and valued his contributions. In his own explorations, Mull had come across Leffingwell's base camp on Flaxman Island in 1966.

When Leffingwell died at the age of 96 in 1971, Mull contacted the Alaska Division of Parks to suggest a marker for the site. He felt it should be protected from damage by some unknowing visitor, and nominated the site for designation in the National Register of Historic Places.

After review by Alaska's Technical Review Board for Historic Preservation, and approval by the National Park Service's Office of Archeology and Historic Preservation, Leffingwell's base camp became 1 of 27 Alaskan nominations to the National Register in 1971. It was entered in the register that summer.

The Alaska Division of Parks gave Mull a plaque identifying the site and citing Leffingwell's accomplishments. He took it with him to an Exxon U.S.A. field camp. From there, a short 45-mile helicopter ride brought him to Flaxman Island. Mull proudly fastened the plaque firmly to the mouldering timbers of *The Duchess of Bedford*, where it may be seen today.

The ruins of his camp are now a monument to the dedication and courage of Ernest de Koven Leffingwell. But more permanent and more valuable are the cartographic and geological data he gathered in his years of work on the edge of the Beaufort Sea.

And although John D. Rockefeller never knew it, his \$5,000 donation may yet prove to be the best investment he ever made. □

Tranquillity With a View—Continued



This is a compilation of the most up-to-date information possible on up-coming sales of public lands by State Offices of the Bureau of Land Management. For details of land descriptions, prices, and other information pertinent to sales, you must write the individual State Office concerned. In most cases, there are adjoining land-owners who have statutory preference rights and may wish to exercise them to buy the land. Sales notices will point out, insofar as possible, problems relating to (1) access, (2) adjoining owner preference rights, (3) small-tract sales limitation of one per customer, and other pertinent information. When possible, all sales are scheduled far enough in advance so ample notice can be given in Our Public Lands. Sales listed can be canceled on short notice for administrative and technical reasons. A listing of BLM State Offices with addresses is found on the opposite page.

MONTANA

40 A, identified as M 20083 (ND), isolated, located in Eddy County, N. Dak., about 1½ miles southeast of Harnar. Terrain nearly level with a few shallow depressions. Soils vary from sandy to sandy loam, highly susceptible to both wind and water erosion. Vegetation grassland low-shrub type. No water nor legal access. Past use livestock grazing. Write Montana State Office for costs and other details. Sale latter part of August.

80 A, identified as M 23786, isolated, in Blaine County, Mont., located approximately 37 air miles south of Chinook. Ridge drops off steeply to south in very broken topography. To northeast slope falls rapidly, then moderates to gentle slope. Soils generally loam textured, varied in depth, carry varying amount of rock. Primary vegetation grasses. No water nor legal access.

Historical use has been livestock grazing. Write Montana State Office for costs and other details. Sale latter part of August.

NEW MEXICO

10.625 A, identified as NM 14578, on Highway 17 immediately west of Blanco and 22 miles east of Farmington, N. Mex., in San Juan County. One-half mile north of San Juan River. Legal access from State Highway 17 with one-quarter mile of highway frontage. Utilities available. Level terrain with deep, sandy loam soil suitable for cultivation. Homesite potential. No appraisal.

10 A, identified as NM 13692, at northwest edge of City of Farmington, one-eighth mile west of 35th Street and Melrose intersection. Legal access via extension of 35th Street which will bisect tract from east to west. High potential for residential subdivision. Will be zoned R-1A, single family residential (minimum lot size 10,000 sq. ft.), according to city's land use plan. City utilities nearby. Terrain over 50 percent level, remaining moderately sloping. In area of medium to high priced homes. Good views. No appraisal.

37.37 A, identified as NM 14856, located 25 miles south of Santa Fe and 6½ miles southeast of Los Cerrillos, N. Mex., in Santa Fe County. No legal access. Physical access across private lands from ranch headquarters. Terrain moderately rolling. Vegetation scattered pinon-juniper and native grasses. Elevation 5,960. Scenic land with good views. Rural homesite area. No appraisal.

OREGON

Three parcels, identified as OR 6709 A, B, and C, comprising 80 A, 80 A, and 280 A respectively. Appraisal: A—\$5,600, B—\$3,600, C—\$11,200. Located 2 to 3 miles southeast of Community Center of Christmas Valley in northwestern Lake County. Climate semi-arid, annual precipitation 8 to 12 inches. Normal temperature ranges from 23° in winter to 67° in summer, with extremes of -35° to 108°. No legal access to parcels B and C. Powerline right-of-way crosses east end of parcel A. Sale after September 1.

39.56 A, identified as OR 8006, located about 4 miles southeast of Silver Lake, 3 miles south of Oregon State Highway 31 in northwestern portion of Lake County.

Climate semi-arid, average annual precipitation 10 inches. Extreme temperatures range from -40° to 108°; normal range from 23° to 67°. No legal access. Appraised approximately \$1,400. Sale after September 1.

WASHINGTON

20 A, identified as OR 5348 (Wash.), located 1 mile southeast of town of Oroville. Lies approximately 5 miles south of Canadian border in extreme north-central portion of Okanogan County. 5 A vary from level to gently rolling topography, remaining 15 A very steep. Soils sandy and gravelly loam. Vegetation sagebrush, bluebunch wheatgrass, cheatgrass. Elevation between 1,200 and 1,600 feet above sea level. Normal temperature ranges between 10° and 90°. Average annual rainfall 12 inches. No legal access. Appraised approximately \$1,500. Sale after September 1.

BUREAU OF LAND MANAGEMENT

ALASKA:

555 Cordova St.
Anchorage, Alaska 99501
516 Second Ave.
Fairbanks, Alaska 99701

ARIZONA:

Federal Bldg.,
Room 3022
Phoenix, Ariz. 85025

CALIFORNIA:

2800 Cottage Way,
Room E-2841
Sacramento, Calif. 95825

COLORADO:

1600 Broadway
Room 700
Denver, Colo. 80202

IDAHO:

Federal Bldg.,
Room 334
550 W. Fort St.
Boise, Idaho 83702

MONTANA (N. Dak., S. Dak.):

Federal Bldg.
316 North 26th St.
Billings, Mont. 59101

NEVADA:

Federal Bldg.,
300 Booth St.
Reno, Nev. 89502

NEW MEXICO (Okla.):

Federal Bldg.
P.O. Box 1449
Santa Fe, N. Mex. 87501

OREGON (Washington):

729 Northeast
Oregon St.
P.O. Box 2965
Portland, Ore. 97208

UTAH:

Federal Bldg.
125 South State St.
P.O. Box 11505
Salt Lake City, Utah 84111

WYOMING (Nebr., Kans.):

2120 Capitol Ave.
P.O. Box 1828
Cheyenne, Wyo. 82001

ALL OTHER STATES:

Robin Bldg.
7981 Eastern Ave.
Silver Spring, Md. 20910



GOLDEN EAGLE PASSPORT

. . . covers Entrance Fees to certain areas of the National Park System for purchasers and all persons accompanying him in a single, noncommercial vehicle.

GOLDEN AGE PASSPORT

. . . affords the same entry privileges to persons 62 years of age or older, plus a 50 percent discount on all Federal Special Recreation Use Fees in designated areas.

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The Golden Age Passport is issued free to those 62 or older upon proof of age.

Golden Eagle Passport revenues and Special Use Recreation Fees go into Federal outdoor recreation programs under the authority of the Land and Water Conservation Fund Act of 1965, as amended.

The Passport program is administered by the Department of the Interior's Bureau of Outdoor Recreation.

YOUR PASSPORTS TO OUTDOOR RECREATION

